

Abstract Submitted
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Increasing LIGO sensitivity by feedforward subtraction of auxiliary length control noise¹ GRANT MEADORS, University of Michigan, KEITA KAWABE, LIGO Hanford Observatory, KEITH RILES, University of Michigan — LIGO, the Laser Interferometer Gravitational-wave Observatory [Hanford, Washington and Livingston, Louisiana] measures the differential length of 4-km Michelson arms with Fabry-Perot cavities. Length changes could indicate strain caused by astrophysical sources of gravitational waves. Fundamentally limited by seismic noise, thermal suspension noise, and laser shot noise in different frequency bands, a LIGO interferometer's sensitivity can also be degraded by additional relative motion of the inner arm cavity mirrors due to imperfectly-servoed Michelson motion. In this project we seek to subtract the effects of this residual motion by feedforward correction of the gravitational-wave data channel. We divide data from LIGO's sixth science run into 1024-second time windows and numerically fit a filter representing the frequency-domain transfer function from Michelson servo noise to gravitational wave channel for each window. Finally, the Michelson servo channel is processed through the filter and is subtracted from the gravitational-wave signal channel. The algorithm used in this procedure will be described with a preliminary assessment of the achievable sensitivity improvement.

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